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Your petitioner, **WILLIAM B. SYKES, SR.**, a citizen of the United States and a resident of the city of Greensboro, State of North Carolina, whose post office address is 3313 Windrift Drive, Greensboro, North Carolina 27410, prays that Letters Patent may be granted to him for improvements in an **ELECTRICAL DEVICE FOR SENSING A SURFACE** as set forth in the following specification.

ELECTRICAL DEVICE FOR SENSING A SURFACE

FIELD OF THE INVENTION

The invention herein pertains to an electrical sensing device and particularly pertains to a sensing device which can be used by persons suffering from nerve damage to their feet and lower legs to assist them while walking.

DESCRIPTION OF THE PRIOR ART AND OBJECTIVES OF THE INVENTION

In recent years patients with nerve deterioration or damage in their feet and lower limbs have sought various treatments and devices to assist them in walking. Crutches, canes, walkers, wheelchairs and the like have all been used with varying degrees of success. However, many patients suffer only slight nerve damage in their feet or lower legs and may not want or need conventional walking assistance devices. However, only limited choices are available and such patients require assistance in some form.

In view of the current inconvenience and disadvantages of various walking aids and devices currently available, the present invention was conceived and one of its objectives is to provide an electrical device for sensing a surface which can be

easily placed on the foot and leg of the wearer, yet which is unobtrusive compared to standard walking aids.

It is also an objective of the present invention to provide an electrical device for sensing a surface which will immediately inform the wearer as the foot contacts the ground.

It is a further objective of the present invention to provide an electrical device for sensing a surface which will allow a patient with nerve damage to the foot to walk with ease and confidence.

It is still a further objective of the present invention to provide an electrical device for sensing a surface which includes a battery operated power supply, a switch and a vibrator.

It is yet a further objective of the present invention to provide an electrical device for sensing a surface which includes a strap for maintaining a vibrator at a desired location along the leg.

It is still a further objective of the present invention to provide an electrical device for sensing a surface by the foot which includes a modified shoe having a normally-open switch mounted in the heel.

Various other objectives and advantages of the present invention will become apparent to those skilled in the art as a more detailed description is set forth below.

SUMMARY OF THE INVENTION

The aforesaid and other objectives are realized by providing an electrical device for sensing the ground or other surfaces while walking. The device includes a shoe which contains a normally-open switch mounted in the heel. The switch is positioned in an opening in the bottom of the shoe heel and is affixed therein by the use of a resilient polymeric adhesive such as a conventional rubber adhesive as is commonly available. A conductor is attached at one end to the switch and the other end of the conductor is attached to a power supply and vibrator mounted on an adjustable leg strap, such as a strap formed from hook and loop fastener material. The conductor is of a sufficient length to allow the strap to be affixed proximate the knee of the wearer. Thus, as the wearer places his shoe heel against the ground surface, the switch is closed allowing current from the battery to flow through the switch to the vibrator. The vibrator provides a signal to the wearer through the leg whereby the wearer recognizes the foot is in contact with the ground. Thus, with nerve damage to the foot a wearer can walk in a normal manner while receiving the vibrational signals through the leg.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates a schematic view of a leg with the electrical sensing device of the invention contacting a ground surface;

Fig. 2 demonstrates an enlarged bottom view of the shoe as seen in Fig. 1;

Fig. 3 shows the leg as in Fig. 1 with the shoe positioned slightly before making ground contact;

Fig. 4 depicts the shoe as seen in Fig. 3 immediately after ground contact is made; and

Fig. 5 features a schematic representation in reduced form of the electrical circuitry of the sensing device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT AND OPERATION OF THE INVENTION

For a better understanding of the invention and its operation, turning now to the drawings, Fig. 1 shows in schematic representation preferred sensing device 10 which includes a push button switch 11 mounted in heel bottom 12 of preferred sport shoe 13, seen also in Fig. 2. While shoe 13 is a typical sports shoe, various other types of shoes could be used as desired. Switch 11 also shown in Fig. 5 is preferably

a standard normally-open type switch having resiliently mounted push button 15, as purchased for example from a Radio Shack retail store as located throughout the country.

In Fig. 2, switch 11 is mounted in a standard resilient, flexible adhesive 16 in heel opening 17. Adhesive 16 will not break or crack due to its flexibility as push button 15 is depressed and returns and also seals heel bottom 12 from water penetration. In Fig. 3 push button 15 extends slightly from heel bottom 12 of shoe 13 and as heel bottom 12 makes contact with ground surface 14 in Fig. 4, push button 15 is depressed thereby closing switch 11, allowing current to flow through electrical circuitry 20 as shown in Fig. 5. Current passes from standard preferred nine volt (9V) battery 21 through switch 11 to vibrator 25. Vibrator 25 is a typical cell phone vibrator preferably model No. 1E110, as sold by American Science & Surplus, Inc. of Skokie, Illinois, which vibrates to signal the wearer that ground contact has been made. The terms "ground" and "ground surface" as used herein refer to any surface such as sidewalks, floors, walkways, streets and other surfaces encountered during walking.

Vibrator 25 is positioned within leg strap 30 which consists of hook and loop fastener material with electrical conductor 28 attached thereto. Electrical conductor 28 is connected to battery 21 and vibrator 25. Thus when switch 11 is depressed as shown in Figs. 1 and 4, vibrator 25 is activated and instantly signals the wearer that heel 12 has contacted

ground surface 14. By sensing ground surface 14 the wearer can then walk with confidence, even with loss of normal foot nerve stimulation.

While the drawings herein only depict one shoe 13 being worn, each shoe of the wearer could be likewise configured with sensing device 10 if nerve damage has occurred in both feet.

The illustrations and examples provided herein are for explanatory purposes and are not intended to limit the scope of the appended claims.